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TRU-FRAME Steel Truss

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TRU-FRAME STEEL TRUSS

THE NEED

After earthquakes, repair and replacement of structural elements is time consuming and expensive. This new truss system contains several diagonal elements designed to absorb seismic energy and yield at prescribed levels. After a quake, the diagonals are easily accessible for repair or replacement.



FIGURE 1 TRU-FRAME STEEL TRUSS

THE TECHNOLOGY

Fabrication of the horizontal framing takes days with this system, compared to weeks in a conventional wide flange system. Erection time saving can vary based on quantity and size of frames along with inspection requirements but the minimum time savings achieved should be 20% with potential reduction of as much as 70%. Standard moment frame design requires 100% visual inspection and ultrasonic testing which is eliminated when using the Tru-Frame system. Since all Tru-Frame connections are single pass fillet welds and tension control bolts, they can be visually inspected any time after completion without need for additional testing. This allows subsequent trades to start their work sooner. On a standard 100,000 square foot commercial office building there would be at least a two-week reduction in the erection schedule alone.

THE BENEFITS

- Tru-Frame provides both substantial cost and time savings while providing a better level of performance. It provides cost savings in material and shop fabrication and in erection.



- An open web steel joist typically weighs about 20% less than a wide-flange beam capable of carrying the same gravity loads.
- Fabrication costs for open web framing are about 20% less than fabrication cost of comparable wide-flange beams.
- The combination of less weight per square foot of building area and less production cost per pound provides a 30% savings overall on the material.
- Shop drawing time is dramatically reduced since the drawings are prepared in conjunction with the development of the contract documents.
- Fabrication time is cut in half for open web framing versus conventional wide-flange frames due to the split responsibility between the steel fabricator just providing the columns and the joist manufacturer fabricating all the horizontal framing.
- Labor costs are reduced by as much as 90% due to the reduction in connection testing time.

STATUS

In 1997, steel producer, Nucor Corp. released a draft guide for designing "special moment-resisting truss frames" - aimed at reducing earthquake damage to steel structures and put it into use by developing a practical in-field application from the study findings, the Tru-Frame. On Gateway Oaks Iv, an 84,000 square foot four-story office building, savings of almost \$3.00 per square foot in the steel structure were achieved and the project schedule was accelerated two months, allowing early occupancy and an additional savings to the owner of another \$2.00 per square foot. [Construction Innovation Forum](#) honored Tru-Frame as one of the winners of 1999 Nova Award.

POINTS OF CONTACT

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REFERENCES

1. 1999 Nova Award Nomination Entry, "TRU-FRAME steel truss moment framing".

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.



PUBLISHER

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